



This document contains Charting the Course of the Comprehensive Conservation and Management Plan for Tampa Bay: Goals and Priorities for Tampa Bay, Introduction to Action Plans

The report (tampabay_ccmp_pt3.pdf) can be downloaded from:

<http://www.epa.gov/owow/estuaries/ccmp/documents/tampabay.html>

File 3 of 7

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Goals and Priorities for Tampa Bay

Charting the Course advances specific goals and associated strategies to restore and protect water quality and bay habitats, as the foundation for healthy and diverse populations of fish and wildlife. These goals and priorities for Tampa Bay are the focal point of the master plan for Tampa Bay and the subject of this chapter.

When the Tampa Bay National Estuary Program was formed in 1991, local government and regulatory agency partners pledged to participate with citizens and scientists in the development and implementation of a Comprehensive Conservation and Management Plan for Tampa Bay. Efforts by the Program's technical advisors over the past five years have centered on developing specific resource goals as long-term measures of success in implementing the bay restoration blueprint.

These goals for Tampa Bay, and the foundation for establishing them, are profiled below and in the accompanying chart, which also identifies priority actions.

GOALS FOR WATER & SEDIMENT QUALITY

Water quality goals focus on maintaining the proper water clarity to support seagrasses by controlling nitrogen, which continues to be a major concern in Tampa Bay. Excess nitrogen in rainfall, stormwater runoff, and from domestic and industrial point sources accelerates the growth of algae in the bay, limiting light penetration to seagrasses, which require sunlight to grow. Past water quality declines contributed to the loss of nearly half of the bay's seagrasses (or almost 19,000 acres) from the 1950s to the 1980s, although seagrasses are gradually returning in areas of the bay where water quality has improved.

In July 1996, the Tampa Bay NEP adopted a five-year management goal to cap nitrogen loadings to the bay at existing levels (1992-1994 average). This effort is expected to provide water quality conditions suitable for the regrowth of more than 12,000 acres of seagrass over time. Nitrogen loadings to Tampa Bay are expected to increase 7 percent by 2010, or about 17 tons per year, as a result of population growth. Therefore, local governments and industries will need to offset loadings to the bay by this amount to maintain existing nitrogen loadings. The NEP will revisit the nitrogen goal and associated management strategies every five years, or more often, as significant new information becomes available.

Local government partners have tentatively agreed to reduce their future nitrogen loadings to the bay by at least 6 tons per year — that portion of the load which is

attributed to stormwater runoff and discharges from municipal point sources. A nitrogen management consortium of key industries, local governments and regulatory agencies has been established to develop a plan to address the remaining 11 tons of nitrogen, which comes from atmospheric deposition, industrial point sources, fertilizer shipping and handling, and intensive agriculture.

Toxic contaminants in bay sediments represent another primary focus of concern for Tampa Bay. Studies by the National Oceanic and Atmospheric Administration (NOAA) and the Florida Department of Environmental Protection (FDEP) in the late 1980s and early 1990s documented relatively high levels of pesticides, heavy metals and other contaminants in sediments, and associated impacts to marine life at some bay sites.

The goal is to protect relatively clean areas of the bay from toxic contamination, and minimize risks to bay wildlife and humans associated with contamination in impacted areas.

Results of recent risk assessment conducted for the Tampa Bay NEP indicate that some contaminants are present at concentrations high enough to be harmful to fish and wildlife, either through direct exposure or indirectly via the food web. The first phase of the risk assessment, completed in 1996, evaluated the risk to human health and marine life from contaminants in Hillsborough Bay and Boca Ciega Bay, two of Tampa Bay's most impacted sectors.

Contaminants of concern identified in the study include several metals, polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and chlorinated pesticides. Most of these pollutants enter the bay in stormwater runoff or through atmospheric deposition. An action plan to address toxic contaminants in the bay and outline more specific management goals will be developed by November 1997, following completion of the second phase of the risk assessment.

Recent events also have focused the attention of citizens and bay managers on problems associated with sanitary sewer overflows and discharges to the bay during heavy rainstorms. That problem came to light during the summer of 1995 when the City of St. Petersburg was forced to discharge about 15 million gallons of untreated sewage into Boca Ciega Bay to minimize sewage backup into homes. Excessive rainfall had infiltrated the wastewater collection system and caused the overflows. Other communities around the bay and nationwide have experienced similar problems during periods of heavy rainfall. To keep the bay safe for swimming and shellfish harvesting in the future, local communities will need to grapple with infrastructure improvements that will ensure that the significant investments made to upgrade sewage treatment facilities are not diminished by chronic failures in collection networks.

GOALS FOR BAY HABITATS

The restoration and protection of seagrasses is a key goal of *Charting the Course*, which establishes a nitrogen management strategy to encourage seagrass recovery. The goal is to restore 12,350 acres and protect the bay's existing 25,600 acres of grass beds. This is based on restoring the vital underwater seagrass meadows to 1950s levels, except in areas that have been permanently altered. It will be achieved largely by

controlling the bay's nitrogen intake—although other factors, such as turbidity and water color, also influence seagrass regrowth.

More than 4,000 acres of new or expanded seagrass beds have been documented in the bay since 1982, thanks to improvements in water quality. But recovery will be a long-term process because of the time it takes for seagrasses to recolonize an area once conditions have improved. For coastal habitats, the plan is to restore the historic balance of coastal habitats in order to better support the bay's fish and wildlife populations, recognizing that some vital habitats have declined more rapidly than others. Declines have been particularly severe for tidal streams and tributaries, which are critical nurseries for numerous species of fish, such as snook and mullet.

The goal is to restore at least 100 acres of low-salinity tidal stream habitat every five years, for a total increase over time of 1,800 acres, while preserving existing salt marshes and mangroves. This may be accomplished either through habitat restoration or enhancement of existing areas that have been severely degraded. Strategies outlined in the plan build on existing efforts, including SWFWMD's practice of creating "habitat mosaics."

The NEP habitat restoration and protection master plan, available under separate cover, also identifies 28 sites as priorities for protection, either through direct purchase or methods such as conservation easements. The majority of these sites have been designated by SWFWMD as priorities for acquisition in their Save Our Rivers/Preservation 2000 plan.

While the plan's primary focus is on repairing tidal streams, other habitats also will be gradually restored. A key effort will be to identify and restore small freshwater ponds that are critical to the survival of the white ibis, which lives along the bay but depends upon freshwater crayfish and insects to feed its young. Additional work is planned for upland forests, mud flats and salt barrens (extremely salty high marsh), all of which play an important role in the Tampa Bay ecosystem.

The NEP also seeks the establishment of adequate freshwater inflows to Tampa Bay and the lower reaches of its tributaries, particularly from rivers impounded by dams. This is essential to preserving the overall health of the estuary. A schedule for establishing these flows has been set for the bay's major rivers. NEP will participate with SWFWMD in this process by convening an advisory group to develop technical recommendations for flows on the Hillsborough River and Palm River/Tampa Bypass Canal.

GOALS FOR FISH & WILDLIFE

While the Tampa Bay NEP has not adopted any specific goals for increases in fish and wildlife species, the goals established for water quality and habitat restoration will provide direct benefits for fish, birds and other bay inhabitants by improving the areas in which they live, reproduce and feed.

Reductions in nitrogen loading and increases in seagrass coverage, for instance, will assist efforts to increase fisheries and return the bay scallop to Tampa Bay by providing suitable water quality and habitat. Achieving the NEP's seagrass recovery target

also will help the bay's population of endangered manatees, which feed in seagrass beds.

Birds, too, will benefit from the goals set forth in the NEP's habitat restoration master plan, which will assure protection and enhancement of existing habitats important for feeding and nesting, and increase other habitats, such as salt barrens and freshwater ponds, which have been severely reduced because of development.

Additionally, preserving the flow of fresh water into the bay from its myriad tributaries will yield dividends for a variety of commercially and recreationally valuable fish, which seek out these sheltered, low-salinity havens as nurseries.

OTHER BAY IMPROVEMENT GOALS

Other goals, aimed at improving spill prevention and response and dredging and dredge material management, are equally important in preserving the bay's health and promoting cooperative planning.

The goal for spill prevention and response is the installation of a state-of-the-art Vessel Traffic and Information System (VTIS) that employs a combination of shore-based radar and global positioning technology to monitor and control shipping traffic in the bay. The system would greatly reduce the likelihood of an economically and environmentally devastating spill of oil or other hazardous materials.

Charting the Course also calls for the development of a long-term, coordinated dredging and dredged material disposal plan, directed by the U.S. Army Corps of Engineers and involving the bay's three major seaports. The plan would address long-term disposal needs, seek to reduce the environmental impacts associated with dredging, and maximize beneficial uses of material dredged from the bay's shipping channels.

MEASURES TO ENSURE SUCCESS

Local government and agency partners have pledged to continue their participation in the NEP to ensure regular dialogue, review actions and evaluate progress toward meeting the bay's goals. Continued monitoring of the bay's health also is essential to this process (see Monitoring Bay Improvement). This allows policy leaders and bay managers to adjust management actions as necessary to keep the plan on track.

Sustaining broad-based citizen support for bay restoration and protection will be equally vital to the success of the plan. The Tampa Bay NEP will continue strong community outreach and education efforts as the plan is implemented. These efforts are discussed in the chapter on Public Education and Involvement Action Plan.

An overall theme expressed in various action plans is to better utilize existing federal, state and local resources to carry out recommended actions. A strong focus on compliance monitoring and enforcement also is emphasized throughout the plan and in specific actions to ensure that environmental regulations are followed.

CHARTING the COURSE:

Charting the Course, the Tampa Bay National Estuary Program's management blueprint for Tampa Bay, details progress made in restoring and protecting Florida's largest open-water estuary and strategies for continuing improvements well into the next century. The following goals and priorities have been adopted by the Tampa Bay Management Conference and will be the focal point of the implementing agreement signed by NEP partners in 1997.

Water & Sediment Quality

Aided by laws requiring construction of better sewage treatment facilities and improvements in stormwater management, water quality in Tampa Bay is improving. However, excess nitrogen and toxic contaminants continue to be key concerns. Goals for improving water and sediment quality include:

- Preventing increases in the bay's nitrogen levels to provide water clarity suitable for the gradual recovery of 12,350 acres of seagrass. To maintain existing water quality conditions, local governments and industries will need to reduce their future nitrogen contributions to the bay by about 7 percent by the year 2010, or approximately 17 tons per year.
- Reducing the amount of toxic chemicals in contaminated bay sediments and protecting relatively clean areas of the bay from contamination.
- Gaining a better understanding of the role that air pollution plays in the bay's water quality, and identifying and addressing the sources of air pollution.
- Reducing bacterial contamination now present in the bay to levels safe for swimming and shellfish harvesting.

Status: Local government partners in the NEP have tentatively pledged to reduce their future nitrogen loadings to the bay by about 6 tons per year - that portion of bay loadings attributed to stormwater runoff and municipal point sources. A Nitrogen Management Consortium of local utilities, industries, agricultural interests, local governments and environmental agencies was established in 1996 to develop a plan to address the remaining balance of 11 tons of nitrogen per year, which is expected to come from atmospheric deposition, industrial point sources, fertilizer shipping and handling, and intensive agriculture. See Action WQ-1 for details.

Ongoing studies of atmospheric deposition (Action AD-1) and toxic contaminants (Action TX-1) are improving bay managers' understanding of these important issues. Action PH-1 calls for the development of maintenance plans by local governments to address sewer overflow problems.



Bay Habitats

Water quality improvements are aiding the return of seagrasses to the bay, but other habitats - particularly tidal streams and marshes critical to fish and wildlife - also will require a concerted, long-term restoration effort. Goals and priorities for improving bay habitats include:

- Recovering an additional 12,350 acres of seagrass over 1992 levels, while also preserving the bay's existing 25,600 acres and reducing propeller scarring of seagrasses.
- "Restoring the historic balance" of coastal wetland habitats in Tampa Bay by restoring at least 100 acres of low-salinity tidal marsh every five years, for a total increase over time of 1,800 acres.
- Preserving and enhancing the bay's 18,800 acres of existing mangrove/salt marsh habitats, including the 28 coastal habitat sites designated as priorities for protection, either through public purchase or methods such as conservation easements.
- Establishing and maintaining adequate freshwater flows to Tampa Bay and its tributaries to increase crucial low-salinity habitat.

Status: More than 750 acres of new or expanded seagrass beds have been documented since 1992; by preventing future increases in nitrogen entering the bay, water clarity should be sufficient to achieve seagrass recovery goals. Details on progress in habitat restoration and protection are provided in Action BH-1. A schedule for establishing minimum freshwater flows from impounded rivers was adopted by SWFWMD in 1996. Action FI-1 provides details.

GOALS & PRIORITIES OF THE TAMPA BAY PLAN

Fish & Wildlife

Charting the Course seeks to increase the number, diversity and health of the bay's fish and wildlife populations by improving the areas in which they live, feed and reproduce. Restoring water quality and bay habitats will be the primary focus. Another priority to bolster fish and wildlife populations in the bay is:

- Improving the on-water enforcement of fishing and environmental regulations.

Additionally, *Charting the Course* calls for the establishment of a working group of the Agency on Bay Management to evaluate and develop recommendations for local manatee protection zones.

Status: See Actions WQ-1, BH-1 and FI-1 for updates on efforts to improve water quality and bay habitats. Local enforcement needs are discussed in Action FW-1. Additional recommendations are discussed in the Fish & Wildlife Action Plan.

Spill Prevention & Response

The oil spill that occurred in Tampa Bay in August 1993 spotlights the need for preventive measures to avoid future spills of oil and other hazardous materials, and to ensure rapid cleanup of spills that do occur. The priority for spill prevention and response is to:

- Install a state-of-the-art vessel traffic and information system (VTIS) to improve coordination of ship movements along the bay's narrow shipping channel

Status: NEP approved \$40,000 in 1996 to support improvements to the existing ship monitoring system. This is part of an overall plan by the Tampa Bay VTIS Consortium to develop and implement a Vessel Traffic and Information System; Action SP-1 provides details.

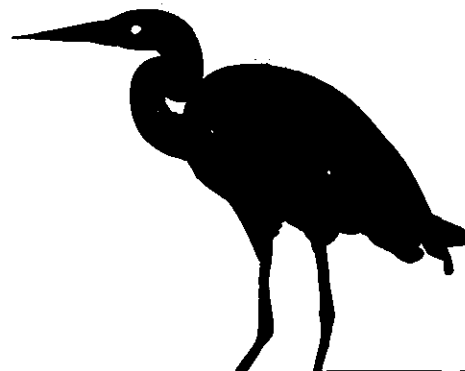


Dredging & Dredged Material Management

Maintenance of the bay's network of navigational channels is important both to commercial maritime industries and recreational interests. But a more coordinated approach is needed to protect the bay from the potentially damaging effects of such activities and address long-term disposal needs. The priority for dredging and dredged material management is:

- Developing a long-range dredged material management plan for the bay that will minimize environmental impacts and maximize beneficial uses of the dredged material.

Status: The NEP has allocated \$40,000 to the U.S. Army Corps of Engineers to begin development of the long-term plan in 1997, in cooperation with local port authorities and bay interests. See Action DR-1.



CHARTING
the COURSE
FOR TAMPA BAY

Introduction to Action Plans

The Tampa Bay National Estuary Program was established in 1991 to assist the community in developing a Comprehensive Conservation and Management Plan (CCMP) for Tampa Bay. The CCMP includes six Action Plans for bay improvement, addressing:

- Water & Sediment Quality
 - Nitrogen Management
 - Stormwater Runoff
 - Atmospheric Deposition
 - Wastewater
 - Toxic Contamination
 - Public Health
- Bay Habitats
 - Freshwater Inflow
- Fish & Wildlife
- Dredging & Dredged Material Management
- Spill Prevention & Response
- Public Education & Involvement

Local government and agency partners in the Tampa Bay NEP expect to sign an agreement in 1997 pledging to achieve the goals for water quality and natural resource recovery, as well as priorities for spill prevention and response, and dredging and dredged material management (see preceding chapter).

How those goals are achieved will be left up to individual communities, who may select from among a range of acceptable alternatives. Many of these options are outlined in the following Action Plans for bay improvement. This approach not only emphasizes flexibility, but allows local governments to focus their limited resources in the most cost-effective and environmentally beneficial manner.

Bay Action Plans define the bay's most pressing needs, and present strategies to achieve bay goals and maximize the community's long-term return on investment. Some actions can be implemented quickly and with existing resources. Others will require long-term community commitments. Whenever possible, strategies presented in *Charting the Course* seek to strengthen or redirect existing bay programs to accomplish more with available resources.

Action Plans have been developed with assistance from bay experts and advocates working through the Tampa Bay NEP's management, technical and community advi-

sory committees. Each Action Plan begins with an introduction to the issue followed by the proposed actions. Cost estimates are presented for each action.

A key addition since the release of the draft CCMP in January 1996 is an overall water quality action describing nitrogen management goals for Tampa Bay and the process for achieving them. New information also is provided in the Action Plans on Atmospheric Deposition and Toxic Contamination, including updates on important research already underway.

Preliminary analyses suggest that the cost to meet certain water quality goals for Tampa Bay will be relatively minimal over the plan's lifetime (see Implementation & Financing chapter). For example, local communities and industries will need to reduce future nitrogen loadings to the bay by about 17 tons (or about one-half percent of the total load) per year to maintain water quality levels and provide for continued seagrass recovery. The cost of achieving that goal is estimated at an additional \$2 to \$4 million per year over current expenditures, or about \$2 per bay area resident.

The Tampa Bay NEP invites and encourages your comments as we begin implementation of the management plan for Tampa Bay.

*Bathers at Spa Beach
and City Pier in St.
Petersburg (1925).*



PHOTO: BURGERT BROTHERS

Water & Sediment Quality

Tampa Bay is rebounding from decades of pollution that reached an apex in the 1970s, when vast algal blooms clouded the water in some bay sectors and seagrasses struggled to survive.

Today, water quality improvements are helping to chart a course for the bay's recovery. Since 1982, more than 4,000 acres of seagrasses — which provide life-support to many of the bay's fisheries — have either sprouted in once-barren areas or filled in previously patchy meadows as a result of water quality gains. Improved conditions also may be setting the stage for a recovery of the bay scallop in lower Tampa Bay, which disappeared in the 1960s when the bay was badly polluted.

Most water quality gains are attributed to Advanced Wastewater Treatment technologies, which have significantly reduced nitrogen in wastewater discharged to the bay. Municipal sewage treatment facilities now contribute just 10 percent of total bay nitrogen loadings, as compared to 40 percent in the mid-1970s.

CHARTING
the **COURSE**
FOR TAMPA BAY

WQ

ACTION PLAN

Water & Sediment Quality

Maintaining these water quality improvements as the region grows represents the foremost challenge for the stewards of Tampa Bay. While direct or “point” discharges of pollution to the bay have declined, other sources such as stormwater runoff and atmospheric deposition have increased and are expected to grow as more people settle in the region. Population in the three counties bordering the bay is expected to increase 17 percent to more than 2.3 million by 2010. Without further action, that growth will be accompanied by increases in nitrogen loadings.

Nitrogen and potentially toxic contaminants (including heavy metals and pesticides) are the key pollutants of concern to Tampa Bay. Pollution pathways, including stormwater runoff, atmospheric deposition and wastewater, are summarized in this section. Additional information is provided in the State of the Bay chapter which precedes this section.

Nitrogen is a naturally occurring and beneficial nutrient that pollutes the bay and inhibits seagrass growth when excess amounts are present. In 1996, the Tampa Bay NEP adopted a five-year management goal to cap nitrogen loadings to the bay at existing levels (1992-1994 average). Studies suggest that staying within those limits will provide water quality that is suitable for the regrowth of more than 12,000 acres of seagrass, a key objective of the NEP management plan.

Nitrogen loadings to Tampa Bay are expected to increase 7 percent between 1995 and 2010, as a result of population growth. This equates to an increase of 17 tons per year, or a total of 266 tons per year by 2010. Consequently, local governments and industries will need to offset the bay’s total nitrogen loadings to the bay by this amount in order to maintain current nitrogen levels. Action WQ-1 discusses the nitrogen management goals for Tampa Bay and the process for achieving them.

Potentially toxic contaminants entering the bay in stormwater runoff, atmospheric deposition and wastewater represent another important focus of concern for bay managers, following studies that identified high levels of contaminants in sediments at various sites, including Hillsborough Bay and Boca Ciega Bay. While contamination appears to be localized, some biological impacts have been documented and others are anticipated. The persistence of these substances in the marine environment and the prospect of increased contamination associated with population growth support the need for action now before the problem escalates. Risk assessments being conducted for the NEP are helping to identify which contaminants pose the greatest concern in heavily impacted areas.

Local governments already are making significant investments each year in stormwater improvements and pollution prevention in the watershed. These actions will continue to be important catalysts in protecting the bay from pollution. Strategies advanced in the NEP’s Water & Sediment Quality Action Plan are designed to focus these substantial efforts and resources to achieve the greatest long-term benefit for the bay.

WATER & SEDIMENT QUALITY GOALS:

- Cap nitrogen loadings to Tampa Bay at existing levels (1992-1994 average) to encourage the regrowth of an additional 12,350 acres of seagrass. To compensate

for anticipated increases in nitrogen loadings, local governments and industries will need to reduce their future nitrogen loadings to Tampa Bay by about 7 percent between 1995 and 2010. A key effort will be gaining a better understanding of the role air pollution plays in the bay's water quality, and addressing the sources of this pollution.

- Protect relatively clean areas of the bay from increases in toxic contamination, and minimize risks to marine life and humans associated with toxic contaminants in impacted areas.
- Reduce bacterial contamination in impacted areas of the bay to levels safe for swimming and shellfish harvesting.

Implement Nitrogen Management Goals for Tampa Bay

WQ-1

ACTION:

Implement the nitrogen management goals for Tampa Bay to maintain water quality conditions suitable for the recovery of more than 12,000 acres of seagrasses.

BACKGROUND:

Controlling the bay's nitrogen intake as a means of regaining vital underwater seagrass beds has been one of the most prominent initiatives of the Tampa Bay NEP. Seagrasses were selected by NEP as a yardstick by which efforts to improve the bay will be measured because of their overall importance to the bay ecosystem, and because they are an important barometer of their environment, signaling changes in long-term water quality trends.

An incredible variety of marine creatures — from the stately seahorse to the blue-eyed scallop to the portly manatee — find food, shelter or protection from predators in these dense underwater pastures. In fact, studies show that seagrass beds harbor 50 percent more fish and invertebrates than sand-bottom areas of the bay. Seagrasses also anchor shifting sand and filter pollutants from the water, much as grasses help stabilize the soil on dry land.

Since the turn of the century, pollution and dredging have destroyed more than half of the bay's seagrass beds. But surveys have recorded more than 4,000 acres of new or expanded seagrass beds in Tampa Bay since 1982, some in areas like Hillsborough Bay that had been barren for decades.

This remarkable comeback is largely credited to improvements in sewage treatment that have reduced the amount of nitrogen flowing into the bay, since excess nitrogen causes algae blooms that cloud the water and keep sunlight from reaching the grasses. Using computer models, scientists with the NEP calculate that water quality is now good enough to allow the natural growth, over time, of more than 12,000 acres of seagrass.

In July 1996, the Tampa Bay NEP adopted a five-year management goal to cap nitrogen loadings at existing levels (1992-94 average) to assist the seagrass recovery process. Nitrogen loadings to Tampa Bay are expected to increase 7 percent by the year 2010 as a result of population growth. This equates to an increase of 17 tons per year, or a total of 266 tons of nitrogen per year by 2010. Consequently, local governments and industries will need to offset loadings to the bay by this amount in order to maintain the bay's current nitrogen levels.

Local government and agency partners already have tentatively accepted responsibility for reducing their future nitrogen contributions by at least 6 tons per year, or 90 tons per year by 2010. This is the amount associated with stormwater runoff and municipal point-source discharges. These partners — Hillsborough, Pinellas and

WQ-1

Manatee counties, the cities of Tampa, St. Petersburg and Clearwater and participating agencies — are now developing plans which identify specific projects to address their share of the cleanup. Nitrogen reductions will be carried over from year to year and credited against the remaining shortfall. Additionally, communities may achieve their target loadings more rapidly by implementing projects with greater nitrogen reductions or preventing anticipated increases.

A Nitrogen Management Consortium was established in October 1996 to develop a plan to address the remaining 11 tons per year of nitrogen, which comes from atmospheric deposition, industrial point sources, fertilizer shipping and handling, and intensive agriculture. Participants also are exploring ways to equitably assign the responsibility for managing nitrogen loadings among dischargers, based on their contribution to the problem.

The Consortium is comprised of local utilities, phosphate mining and fertilizer handling companies and agricultural interests, as well as the NEP's six local government partners and regulatory agencies. Working together, the group will identify nitrogen management projects to satisfy the nitrogen management goals established for Tampa Bay. The NEP will assist the Consortium by developing a list of the most cost-effective projects to pursue.

The approach advocated by NEP stresses cooperative solutions and flexible strategies over rigid "command and control" regulatory requirements. Under this plan, local governments and industries may select from among a range of options — as long as the overall goals for nitrogen management are met. This flexibility allows communities to focus their limited resources on the most cost-effective and environmentally beneficial actions.

Without this consensus-building approach to bay management, regulators would have to rely on the traditional permitting and compliance process to achieve the goals of the bay plan. That method can be more time-consuming and expensive, and lacks the flexibility the NEP partners have endorsed.

The NEP will review and revise nitrogen management goals every five years, or more often, if significant new information becomes available.

STRATEGY:

- STEP 1** Complete local government and agency Action Plans and estimate the total amount of nitrogen reduction associated with these partners' projects.
Responsible parties: local governments, Southwest Florida Water Management District (SWFWMD), Florida Department of Environmental Protection (FDEP)
- STEP 2** Continue the Nitrogen Management Consortium with the goal of developing an action plan to reduce future nitrogen loadings to the bay by 11 tons per year, that portion of the future nitrogen load which is attributed largely to atmospheric, industrial and agricultural sources.

WQ-1

ACTION PLAN

Water & Sediment Quality

- A. Identify all nitrogen management projects completed, underway or proposed by Consortium members since January 1995 for completion by the year 2005.
 - B. Develop a method for determining how much credit each project will receive for nitrogen reduction. In fairness to all participants, a consistent method must be developed for estimating credits both for structural improvements, such as stormwater ponds, and non-structural efforts, such as support for the Florida Yards & Neighborhoods Program.
 - C. Determine the difference between estimated reductions associated with projects that are planned and the nitrogen management goals established for Tampa Bay.
Responsible parties: Tampa Bay NEP, in cooperation with Consortium members
- STEP 3 Develop and implement an Action Plan identifying projects that address any shortfall in nitrogen reduction. The NEP will assist the Consortium by identifying the most cost-effective projects for nitrogen reduction in the watershed.
Responsible parties: Nitrogen Management Consortium, in cooperation with the Tampa Bay NEP

SCHEDULE:

The Tampa Bay NEP has received draft Action Plans from its local government and agency partners. These Action Plans will be finalized for review by the Tampa Bay Management and Policy Boards in 1997 and must be adopted no later than one year after the signing of the Comprehensive Conservation and Management Plan (CCMP) implementing agreement in Spring 1997.

The Nitrogen Management Consortium was established in October 1996. Steps 2 and 3 will be completed no later than one year after the signing of the implementing agreement. The NEP will request a preliminary action plan from the Consortium by August 1997.

COST:

Preliminary analyses suggest that the cost to meet nitrogen management goals for Tampa Bay will be relatively small over the plan's lifetime. Local communities and industries will need to reduce future nitrogen loadings to the bay by about 17 tons (or about one-half percent of the total existing nitrogen load) per year to maintain water quality levels and provide for continued seagrass recovery. The cost of achieving that goal is estimated at an additional \$2-\$4 million per year over current expenditures, or about \$2 per bay area resident per year.

EXPECTED BENEFITS:

Achieving the nitrogen management goals for Tampa Bay will prevent increases in the bay's nitrogen burden and provide conditions suitable for the regrowth of an additional 12,000 acres of seagrasses, which are vital to countless marine animals.

MONITORING ENVIRONMENTAL RESPONSE:

Individual projects will be monitored through regulatory permits. Additionally, NEP will prepare an annual report summarizing progress made by each participant for community and Policy Board review. Details of the overall bay monitoring program are provided in the chapter on Monitoring Bay Improvement.

REGULATORY NEEDS:

To be determined, based on projects identified in action plans.

RELATED ACTIONS:

See stormwater, wastewater and atmospheric deposition actions for discussion of nitrogen management strategies.

WQ-1

STORMWATER RUNOFF

Stormwater runoff carrying fertilizer, pesticides, oils and other contaminants from urban and agricultural lands contributes nearly half of the bay's total annual nitrogen loadings and more than 60 percent of the annual loadings of zinc, mercury, lead and chromium.

Contaminants in runoff come from land-use activities and from air pollutants that settle in the bay's watershed. In fact, air pollutants are believed to be a significant contributor to pollution in stormwater runoff to the bay.

Approximately 15 percent of the bay's total nitrogen loadings is attributed to urban stormwater runoff, an amount exceeding all direct or "point" discharges of wastewater to the bay from wastewater treatment and industrial plants. Of that, 10 percent comes from residential areas, which dominate the urban landscape. Commercial and industrial sites, by comparison, contribute the other 5 percent of total bay nitrogen loadings.

Runoff from intensely cultivated agricultural lands (mostly citrus and vegetable production) contributes another 6 percent of total bay nitrogen loadings, as well as potentially significant quantities of pesticides and sediments from erosion. Agricultural runoff also originates from pastures and rangelands, which cover roughly 28 percent of the watershed and account for another 13 percent of total bay nitrogen loadings.

Compared to lands in intensive agriculture, pastures and rangelands are probably less cost-effective to treat, since total loadings per acre are relatively small (see chart). Undeveloped land (at 7 percent) and mining (at 4 percent) comprise the remainder of nitrogen loadings carried to the bay in stormwater runoff.

Bay water quality is improving, thanks largely to improvements in sewage and stormwater treatment and associated declines in nitrogen loadings. But concerns about toxic contamination of bay sediments are growing, following studies that have revealed concentrations of heavy metals and pesticides harmful to marine life at several sites. Many toxic contaminants enter the bay attached to sediments in stormwater runoff, making treatment of sediments in runoff a key component in the strategy to address toxic contaminants.

In fact, stormwater treatment in conventional wetland retention and detention systems can be highly effective in removing sediments from runoff. However, wetland retention/detention is not as effective for reducing nitrogen. Thus, efforts to reduce nitrogen emphasize strategies such as wastewater reuse and pollution prevention measures, as well as efforts to reduce atmospheric deposition of nitrogen to the bay.

The Tampa Bay National Estuary Program has developed a computer model to assist local governments in selecting the most cost-effective best management techniques to employ in battling stormwater pollution. An overall strategy must focus on pollution prevention, stormwater treatment and monitoring to assure compliance with stormwater permits.

ACTIONS TO ADDRESS STORMWATER RUNOFF

Actions to address pollution from stormwater runoff range from recommendations for improved landscape management and urban planning to increased stormwater treatment. Actions to address agricultural runoff focus on water conservation and integrated pest management.

SW

- SW-1 Continue implementation of the Florida Yards & Neighborhoods Program and similar pollution prevention initiatives.
- SW-2 Assist businesses in implementing best management practices to reduce stormwater pollution, and develop model landscaping guidelines for commercial use.
- SW-3 Encourage local governments to adopt integrated pest management policies and implement environmentally beneficial landscaping practices on public properties.
- SW-4 Reduce impervious paved surfaces, focusing on parking space and design requirements for large commercial developments.
- SW-5 Require older properties being redeveloped to meet current stormwater treatment standards for that portion of the site being redeveloped, or provide equivalent compensation.
- SW-6 Promote compact urban development and redevelopment.
- SW-7 Enforce and require the timely completion of consent orders for the cleanup of fertilizer facilities in Tampa's East Bay sector.
- SW-8 Encourage best management practices on farms.
- SW-9 Improve compliance with agricultural ground and surface water management plans.

ADDITIONALLY...

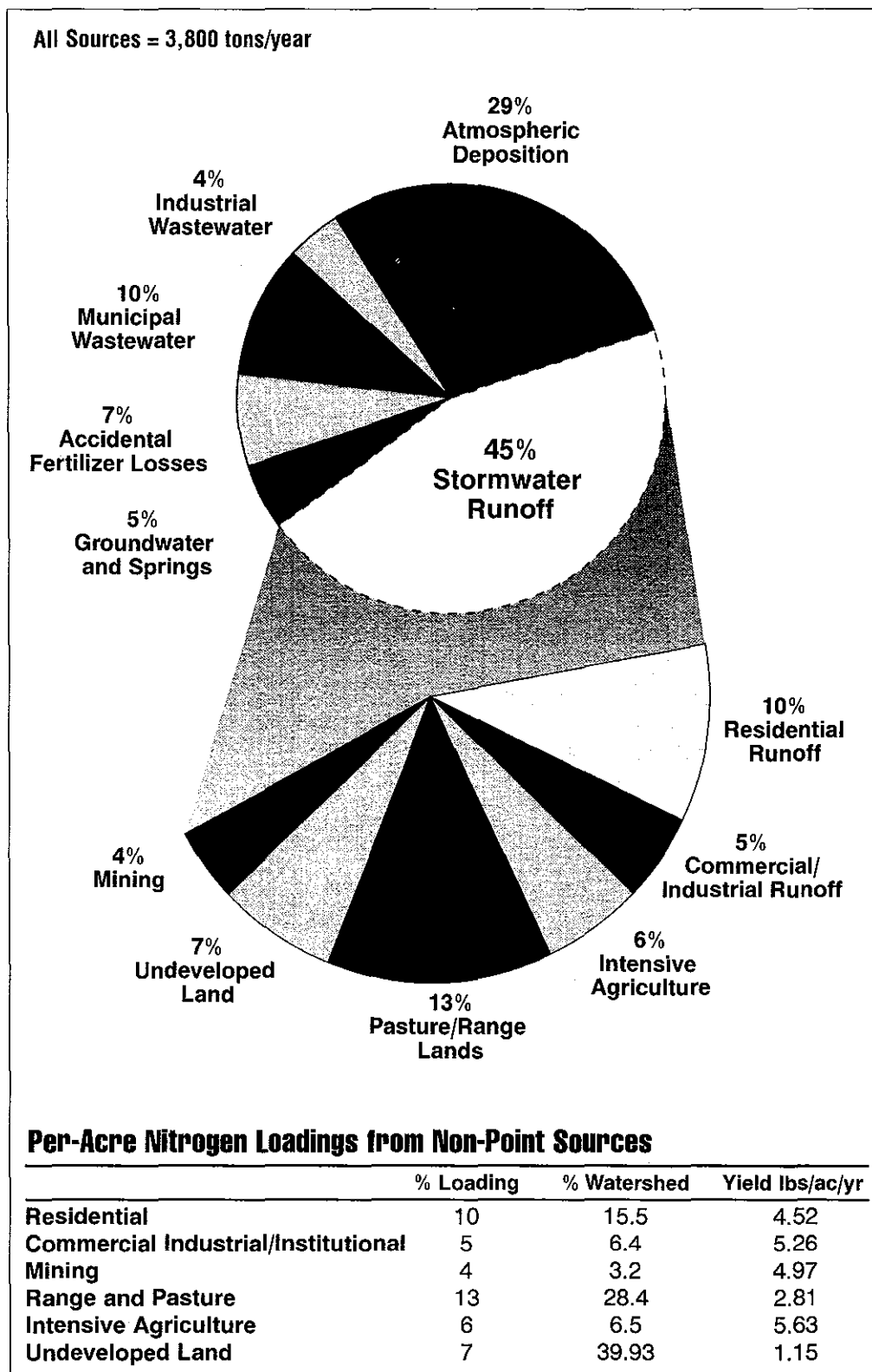
The NEP recommends a workshop in 1997 to discuss the overall issue of compliance monitoring and enforcement of stormwater permits. Compliance monitoring and enforcement was considered a major problem by many advisors to the NEP who helped develop and rank the initial list of actions for the draft Comprehensive Conservation and Management Plan (CCMP) — and is still considered a problem by some people. Many believe that the regulatory system is “front-loaded” — with too many staff allocated to project review and permitting and too few available for compliance monitoring and enforcement. They advocate a shift in resources to address the imbalance. This issue was the subject of an action in the draft CCMP released in January 1996 and requires additional discussion before recommendations are made.

SW

ACTION PLAN

Water & Sediment Quality

Total Nitrogen Loadings to Tampa Bay (1992-1994 average)



SOURCE: COASTAL ENVIRONMENTAL, INC.

Continue Support for the Florida Yards & Neighborhoods Program and Similar Pollution Prevention Initiatives

SW-1

ACTION:

Continue support for the Florida Yards & Neighborhoods Program and similar pollution prevention and education initiatives which encourage homeowners to reduce pollution in residential runoff. Continue to enlist retailers, developers, and the landscaping and pest control industries to practice and promote these concepts.

BACKGROUND:

Yards and neighborhoods are among the bay's first lines of defense against pollution in stormwater runoff. Yet many homeowners fail to understand the potential impact of excess fertilizer, pesticides and water used in landscape maintenance on the health of Tampa Bay.

In fact, scientists estimate that residential land uses in the Tampa Bay watershed contribute about 10 percent of the bay's total nitrogen loadings, as well as other pollutants such as pesticides and herbicides. The impact on Tampa Bay may be immediate in a waterfront neighborhood, or gradual, through the flow of stormwater drains, ditches, streams or rivers.

These findings became the springboard for the development of the Florida Yards & Neighborhoods (FY&N) Program, established in 1991 to enlist residents in pollution prevention by improving their landscaping practices. Experts from the Florida Cooperative Extension Service (FCES), which administers the Program statewide, encourage residents to conserve water and limit their use of fertilizers and pesticides — techniques that can save homeowners considerable time and money. The Program also promotes the establishment of true Florida Yards, featuring plants suited to local conditions, climate and wildlife.

FY&N was developed by the National Estuary Programs of Tampa Bay and Sarasota Bay and the FCES. The West Coast Regional Water Supply Authority (WCRWSA) is currently the major funding source for the Tampa Bay FY&N program, which also draws support from some local governments.

Since its inception, the FY&N Program has assisted dozens of neighborhoods and thousands of individual homeowners through workshops, neighborhood evaluations and plantings, educational literature and the development of model Florida Yards at public venues. The Program also coordinates with local developers and retailers to promote these concepts. A Florida Yard featured in the 1996 Parade of Homes at Fish Hawk Trails in Hillsborough County received extensive publicity and attention. Home Depot recently began publicizing FY&N tips in its in-store literature and advertising inserts.

SW-1

ACTION PLAN

Water & Sediment Quality

This action seeks to continue support for FY&N to effectively reach a larger and more diverse audience in the Tampa Bay region. The NEP also recognizes and supports the efforts of several local initiatives, such as the Hillsborough County Adopt-A-Pond Program, which promote water quality stewardship and neighborhood action.

STRATEGY:

Strategies to continue and expand the FY&N Program, and further enlist developers, retailers and the horticulture/pest control industries in promoting these concepts, are proposed below. The implementation of some strategies will require additional funding.

INDIVIDUAL HOMEOWNERS AND NEIGHBORHOODS

STEP 1 Continue FY&N outreach to organized community and neighborhood associations, with presentations and distribution of the Florida YardStick and the FY&N handbook.

STEP 2 Expand outreach to individual homeowners.

- A. Promote Florida Yard materials and messages at major retail outlets, home and garden shows, public events, and public venues such as The Florida Aquarium.
- B. Pursue arrangements to distribute and bar-code FY&N materials so they may be sold at cost through retail establishments, with revenues tagged for additional reprints.
- C. Increase mass-media publicity efforts and promote the use of existing public service announcements on cable, network and government access stations. Counties also should consider paid media placement campaigns to broaden public interest and awareness of FY&N messages. Media efforts should be coordinated on a regional basis to maximize cost-efficiency and audience reach.
- D. Increase the number of individuals pursuing Florida Yard certification.

Responsible parties: FCES, in cooperation with local governments, WCRWSA and the Southwest Florida Water Management District (SWFWMD)

COST:

Annual costs for staff and materials for program components outlined above are estimated at approximately \$75,000 per county (Hillsborough, Pinellas, Pasco and Manatee). Cooperative funding may be sought from participating local governments, river basin boards of the SWFWMD, WCRWSA, and the Coastal Zone Management Program.

Retailers, Landscape Management and Horticulture Industry

- STEP 1 Pursue partnerships with nursery/garden supply retailers in each county to promote FY&N materials and messages.
- STEP 2 Expand existing training programs, or develop new ones as necessary, to educate retail/landscape management personnel about FY&N concepts.
- STEP 3 Review existing industry certification programs and recommend changes to incorporate FY&N concepts.
Responsible Parties: FCES, in cooperation with local governments, WCRWSA and SWFWMD

SW-1**COST:**

Step 1 is being implemented with existing funding, but additional funding could enable the development of point-of-purchase displays and cover costs for reprinting materials. Additional funding may be required to implement steps 2-3.

Developers/Property Managers

- STEP 1 Promote the development of Model Florida Yards at model home developments in each county and at annual Parade of Homes events. Work with homebuilders' associations and realtors to identify appropriate new housing developments to enlist.
Responsible parties: FCES, with support from local governments
- STEP 2 Develop interpretive signage (including recognition of sponsors) and a promotional brochure that includes a comparison of the costs to develop and maintain a Florida Yard vs. a conventional, maintenance-intensive landscape (see SWFWMD Xeriscape Model Ordinance for reference).
Responsible parties: FCES
- STEP 3 Encourage realtors and property managers to adopt and promote FY&N concepts by providing educational workshops and opportunities to earn Continuing Education Units (CEUs).
Responsible parties: FCES

COST:

Costs to develop a Model Florida Yard at a residential development are estimated at \$5,000, based on plant material, irrigation and interpretive signage. Plants and irrigation costs would be borne by developers, with interpretive signage and consulting provided by FCES. Costs for interpretive signage to promote Model Florida Yards could range from \$500-\$1,000 per site. Funding sources include participating developers, local governments, river basin boards, county realtors' boards and builders' associations.

SW-1

ACTION PLAN

Water & Sediment Quality

SCHEDULE:

FY&N programs are ongoing. Other steps may be initiated in 1997, if FCES is able to secure additional funding from local governments or other cooperating partners.

EXPECTED BENEFITS:

Reduction in fertilizer, pesticide and water use will reduce pollution in runoff to the bay. The increased use of native plants and other beneficial drought-tolerant vegetation in yards is also expected to improve the quality and availability of wildlife habitat.

MONITORING ENVIRONMENTAL RESPONSE:

FCES surveys participants to assess landscape management changes as a result of the program. Public interest in FY&N also can be gauged by tracking distribution of materials and sales at major retail outlets promoting these concepts, number of professionals certified in FY&N concepts, and number of certified Florida Yards.

REGULATORY NEEDS:

None anticipated.

RELATED ACTIONS:

SW-2, SW-3, SW-8

Assist Businesses in Implementing Best Management Practices to Reduce Stormwater Pollution, and Develop Model Landscaping Guidelines for Commercial Use

SW-2

ACTION:

Encourage and assist businesses in implementing best management practices to reduce pollution in runoff, and develop model landscaping guidelines for commercial use.

BACKGROUND:

Local communities offer various levels of assistance to businesses in assessing site management practices and developing pollution prevention strategies. These programs can benefit businesses by identifying opportunities for cost-savings, such as reducing a company's expenditures for fertilizer and pesticides used in landscape maintenance. Pollution prevention programs also benefit local government sponsors, who might otherwise be forced to rely exclusively on costlier stormwater treatment.

One example is Hillsborough County's Operation BayWorks - Businesses for a Cleaner Future, established in 1993 with a small grant from the Tampa Bay NEP. The program enlists and aids businesses in the construction, manufacturing, landscaping and automotive repair industries in the development of pollution prevention plans. Participants learn industry-specific best management practices to reduce pollution associated with landscape management, construction equipment and repair, and hazardous materials use and disposal. Specialty businesses such as auto repair shops are a key target because their collective contribution to pollution in runoff can be substantial. These smaller businesses typically lack knowledge about their potential impact on the environment, as well as the resources to research best management practices on their own.

Local communities are encouraged to evaluate programs such as Operation BayWorks as a model for regional implementation to reduce stormwater pollution from commercial sites. Efforts such as these may help local governments meet federal mandates for pollution prevention as required in National Pollutant Discharge Elimination System (NPDES) stormwater permits.

The Tampa Bay NEP also recommends the development of model landscaping guidelines for incorporation into local government landscape ordinance codes. These guidelines could then become incorporated into the site review process for new development and promoted throughout the development community.

Commercial landscapes often feature large areas of high-maintenance turf grass and exotic plants that demand a steady stream of fertilizer, pesticides and water. Stormwater pollution from commercial sites can be reduced with changes in maintenance practices and landscape design, such as downsizing turf areas and expanding the use of water-thrifty and pest-resistant plants.

SW-2

ACTION PLAN

Water & Sediment Quality

Improvements in landscaping practices are just one important part of an overall strategy to reduce pollution from commercial sites. Another strategy, discussed in Action SW-4, is to reduce the amount of impervious surface associated with large developments by lowering parking space requirements in building codes and promoting alternative pervious materials for overflow parking.

STRATEGY:

STEP 1 Target and assist businesses in implementing site management practices to reduce stormwater pollution. Evaluate Hillsborough County's Operation BayWorks as a model for regional implementation.

A comprehensive program might focus on best management practices for landscaping and landscape maintenance, erosion control, and hazardous materials use and disposal. Workplans may include: business workshops; industry-specific workbooks that promote best management practices and include templates for self-assessment and site management plans; model commercial landscape demonstration sites; follow-up surveys or on-site visits to track progress; regulatory incentives; and recognition through existing environmental awards programs and on-site promotional materials or emblems that participating businesses can display.

- A. Identify and prioritize local target industries and businesses.
- B. Form a business steering committee or utilize an existing structure such as environmental committees of local chambers of commerce to oversee development of the program and materials, with representation from local target industries, environmental agencies and the Florida Cooperative Extension Service (FCES). Materials developed for Operation BayWorks may be modified for these purposes.
- C. Implement program and monitor results.
Responsible parties: local governments, in cooperation with chambers of commerce, private industry councils and local government small quantity generators (SQG) programs, which focus on hazardous waste prevention and remediation

STEP 2 Develop a model landscaping ordinance for adoption throughout the region. The guidelines should be succinct, user-friendly and include a comparison of costs to develop and maintain traditional landscapes vs. a model Florida landscape based on FY&N principles (see SW-1).

Responsible parties: local governments, in cooperation with FCES, Southwest Florida Water Management District, West Coast Regional Water Supply Authority

STEP 3 Incorporate model landscape guidelines into local government site review process for new development or, alternatively, provide incentives such as reductions in stormwater utility fees to developers who agree to meet these heightened environmental landscaping standards.

Responsible parties: local governments

ACTION PLAN

Water & Sediment Quality

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STEP 4 Incorporate Steps 1-3 into NPDES stormwater permits, as examples of efforts to meet federal mandates for pollution prevention.

Responsible parties: local governments

STEP 5 Aggressively promote model landscape design guidelines and maintenance practices throughout the development, business and real estate community, emphasizing cost-savings and environmental benefits.

Responsible parties: local governments, chambers of commerce and private industry councils, Florida Association of Environmental Professionals, builders associations, Florida Native Plant Society

SW-2**SCHEDULE:**

All steps can be initiated in 1997.

COST:

Second-year implementation costs for Operation BayWorks are estimated at \$20,000, plus administrative time. Costs to develop a model landscape ordinance, including landscape cost-comparison analysis, are estimated at \$20,000.

EXPECTED BENEFITS:

Improved landscaping and site management practices and implementation of model landscaping guidelines will reduce pollution in stormwater runoff from commercial sites.

MONITORING ENVIRONMENTAL RESPONSE:

Surveys can be used to track pre-and post-business progress in implementing best management practices to reduce stormwater pollution. Local governments also can gauge business participation by the number of pollution prevention plans developed as a direct result of their outreach.

Stormwater sampling also can be employed to monitor pre-and post-water quality at large commercial sites that agree to implement model landscaping guidelines.

REGULATORY NEEDS:

Dependent upon work plan, but may include amendments to local comprehensive plans, landscape ordinances, criteria for commercial site permitting review, and changes to NPDES permits.

RELATED ACTIONS:

SW-1, SW-3, SW-4

Encourage Local Governments to Adopt Integrated Pest Management Policies and Implement Environmentally Beneficial Landscaping Practices

ACTION:

Encourage local governments to adopt integrated pest management policies and use environmentally beneficial landscaping practices on public properties to reduce pollution from stormwater runoff. As part of this effort, communities are encouraged to commit a minimum of 50 percent of all new public landscapes and retrofits to existing landscapes to low-maintenance designs featuring native or drought-tolerant plants appropriate to the site.

BACKGROUND:

Local government facilities and parks are visited frequently by the public, providing an excellent opportunity to expose residents to environmentally sensitive concepts for landscape design and maintenance.

Many communities already have begun to develop some public sites in accordance with Xeriscape™ principles. For instance, Hillsborough County, in cooperation with the Tampa Audubon Society, is landscaping the planters at its main county office building in Tampa with native plants. However, as new landscapes are planned or as existing landscapes are retrofitted, local governments have an opportunity to further reduce runoff pollution and lead by example, serving as models to citizens who are being asked to conserve water and limit pesticide and fertilizer use.

Changes to comprehensive plans and landscape codes continue to reflect environmental impact concerns, but additional steps can help achieve a broad-based impact within a local government's sphere of influence. Additionally, such efforts can be referenced in the required annual reports for National Pollutant Discharge Elimination System (NPDES) permits, which call for increased pollution prevention.

This action seeks a commitment from local governments to devote at least half of the acreage of all new public landscapes or retrofits to existing landscapes to low-maintenance designs featuring site-appropriate native or drought-tolerant vegetation. It also calls on local governments to adopt resolutions to use Integrated Pest Management (IPM), least-toxic landscape maintenance practices that reduce pesticide use.

Furthermore, information about environmental landscape management (ELM) concepts taught by county cooperative extension services should be communicated regularly to government employees involved in landscape maintenance or the purchase of

fertilizers, pesticides and plant materials. Annual training sessions with those employees could provide updates on new products and techniques that relate to ELM. Sessions of this type also serve to reinforce the commitment made by elected officials and senior staff to environmental quality and pollution prevention.

Hillsborough County is currently revising its landscape ordinance and may incorporate this action.

SW-3**STRATEGY:**

STEP 1 Commit a minimum of 50 percent of all new public landscapes and retrofits to existing landscapes to low-maintenance designs featuring site-appropriate native or drought-tolerant plants, with allowances for areas where turf grass is necessary for recreational use or land application of treated wastewater.

Responsible parties: local governments

STEP 2 Adopt a resolution to use Integrated Pest Management (IPM) on all publicly owned lands, including parks and government facilities. IPM employs biological, cultural and chemical techniques to control pests, and promotes the selective use of pesticides.

Responsible parties: local governments

A model resolution, based on Sarasota County's IPM Policy, has been developed by the Sarasota County Cooperative Extension Service.

STEP 3 Review purchasing specifications for fertilizer and pesticides to assure government use of least-toxic pesticides and slow-release fertilizers as well as cleaning products and other substances and equipment that may be used in site maintenance.

Responsible parties: local governments, in cooperation with county cooperative extension services

STEP 4 Establish annual training sessions for landscape maintenance and purchasing personnel to assure proper use of ELM concepts, BMPs and least-harmful products. Coordinate with the county cooperative extension services to determine if continuing education credits can be provided for approved training.

Responsible parties: local governments

STEP 5 Identify and develop interpretive signage for a minimum of three high-traffic sites where native plants and Florida Yard design and maintenance concepts can be promoted as an attractive alternative to turf grass and exotic plants. Government-owned facilities that resemble residential sites, such as a license tag or utility office, may make ideal candidates for demonstrating how eco-landscaping techniques can be utilized by homeowners.

Also, distribute materials, such as the Florida Yards & Neighborhoods brochure and Florida YardStick, available through the Cooperative

SW-3

ACTION PLAN

Water & Sediment Quality

Extension Service, at these sites. Provide incentives, such as plant giveaways and free design consultations, whenever possible.

Responsible parties: local governments

See also Action SW-2 regarding development of model landscaping guidelines, based on Florida Yards & Neighborhoods principles, for incorporation into local government landscape codes.

SCHEDULE:

All steps can be initiated in 1997.

COST:

Steps 1-4 can be implemented with existing resources. Implementation of IPM and other landscaping best management practices may result in cost savings to governments. Costs to develop model landscapes (Step 5) will vary according to site size and specifications. For example, plant materials and signage for a 7,200-square-foot site could be installed for about \$5,000.

EXPECTED BENEFITS:

Improvements in landscaping and landscape maintenance will reduce stormwater pollution, conserve water and enhance native habitat. The establishment of environmental landscapes at public locations will provide homeowners with an "in-ground" demonstration of these methods.

MONITORING ENVIRONMENTAL RESPONSE:

Local governments monitor water quality. They also can track the amount of consumable materials used to maintain public landscapes to quantify reductions and possible cost-savings.

REGULATORY NEEDS:

Possible revisions to Local Government Comprehensive Plans and landscape codes.

RELATED ACTIONS:

SW-1, SW-2

Reduce Impervious Paved Surfaces

ACTION:

Reduce impervious surfaces in the watershed to reduce stormwater runoff and associated pollution by allowing more water to filter through the soil.

SW-4

BACKGROUND:

Like all growing metropolitan areas, the Tampa Bay region contains large amounts of impervious surfaces that increase stormwater runoff and associated surface water pollution by preventing stormwater from seeping into the ground. The impact may be immediate in a waterfront area, or gradual, through the flow of stormwater drains, ditches, ponds and streams.

Existing regulations complicate the problem. Many development standards require that large amounts of impervious surface be incorporated into projects to support parking. Commercial developments, for example, are often required to have a certain number of parking spaces based on a development's total square footage or anticipated absolute maximum demand. These requirements may over-estimate actual parking needs, which may be better served through a combination of traditional surfaces for main parking lots and pervious surfaces for overflow areas.

The use of pervious materials may also be appropriate for parking lots being enlarged or reconstructed in the urban core. Options include turf block (concrete blocks with holes to allow turf growth and water infiltration), grass and specialized pervious hard-surface materials. The cost-effectiveness of these alternative surfaces will be evaluated as part of this action. Some materials can cost as much as three times the amount of traditional pavement.

STRATEGY:

This action calls for an evaluation of the costs and suitability of pervious surface materials, and promotion of their use where appropriate. It also recommends incentives for developers to incorporate these materials in new developments and redevelopment projects in urban areas closest to hot spots of contamination in the bay.

STEP 1 Using product information supplied by manufacturers and engineering analyses, evaluate the performance and costs of various pervious surface materials and compare them to traditional paving. Provide recommendations to the NEP Management Committee in 1997. Much of this information already is available. The assessment should include:

- costs of materials and parking construction
- liability issues
- life expectancy of materials

SW-4

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- maintenance costs and considerations

Responsible parties: NEP, in cooperation with builders and contractors associations, chambers of commerce and local governments

STEP 2 Identify target areas in which the use of alternative surface materials should be encouraged, and suggest draft revisions to agency rules regulating stormwater to allow credits for pervious pavement. Provide recommendations to the NEP Management Committee in 1997.

- Establish target boundaries for urban sub-basins near bay hot spots of sediment contamination, and overlay information on the areas where local governments are encouraging redevelopment.
- In other areas of the watershed, identify areas where soils may be conducive to the use of pervious pavement.
- Suggest draft rule revisions, including credits for pervious paving.

Responsible parties: NEP, local governments, Southwest Florida Water Management District (SWFWMD)

STEP 3 Based on results of steps 1 and 2, revise local government and agency regulations to encourage the use of pervious alternatives to traditional paving. Options may include:

- basing parking space requirements on expected demand rather than absolute maximum demand, particularly for large developments such as malls, and commercial developments and multi-family dwellings
- providing tax incentives or credits within new taxing sub-districts for the use of pervious paving.
- increasing the ratio of landscaping to site size to reduce impervious surface.

Responsible parties: local governments, SWFWMD

SCHEDULE:

Step 1 can be initiated in 1997. Steps 2 and 3 can be initiated in 1998, based on the recommendations.

COST:

The assessment of pervious paving options can be accomplished through NEP's annual workplan. The actual costs and cost-effectiveness of these materials will be identified as part of the assessment. Steps 2 and 3 will require administrative and staff time of local governments and SWFWMD. Costs to provide incentives or credits for the replacement of impervious surface have not yet been estimated, but may be offset by

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Water & Sediment Quality

reduced municipal costs in treating stormwater runoff. Cost considerations will be closely evaluated in developing recommendations.

EXPECTED BENEFITS:

Reductions in the amount of impervious surface in the watershed will reduce pollutants such as heavy metals, oil and grease, and nitrogen in stormwater discharged to the bay from urban areas.

MONITORING ENVIRONMENTAL RESPONSE:

Local governments monitor ambient water and sediment quality in Tampa Bay.

REGULATORY NEEDS:

Possible revisions to local development standards and stormwater regulations.

RELATED ACTIONS:

SW-5, TX-1

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SW-4

SW-5

ACTION PLAN

Water & Sediment Quality

ment for properties being redeveloped, and to allow alternative means to satisfy those requirements when on-site treatment is not feasible.

Responsible parties: local governments and regulatory agencies, especially SWFWMD

SCHEDULE:

Step 1 can be initiated by the NEP in 1997 pending availability of funds. Step 2 can be initiated in 1998 after the Comprehensive Conservation and Management Plan (CCMP) has been adopted and regulatory flexibility is granted to allow developers to use alternative means to meet requirements when on-site treatment is not feasible.

COST:

Funding for Step 1 is provided in the NEP's FY96 Workplan. Implementation of Step 2, if approved, will require local government and staff time, as well as the costs associated with stormwater treatment or alternative options required. In-lieu fees deposited by developers into a "stormwater bank" could help finance implementation of alternative stormwater treatment options, such as development of a regional stormwater facility or additional street sweeping. A cost-benefit evaluation of alternative treatments is being developed as part of an ongoing project referenced in Step 1.

EXPECTED BENEFITS:

Stormwater treatment from older properties and in the urban areas of the watershed helps to reduce pollution in stormwater runoff from heavily impacted areas. Flexibility is built in to assure stormwater treatment while still encouraging redevelopment.

MONITORING ENVIRONMENTAL RESPONSE:

Local governments monitor ambient water and sediment quality.

REGULATORY NEEDS:

Revisions to local development criteria and SWFWMD stormwater permit rule.

RELATED ACTIONS:

SW-2, SW-4, SW-6, TX-1

Promote Compact Urban Development and Redevelopment

SW-6

ACTION:

Convene a conference of local government and regional planners, architects and neighborhood councils to evaluate and recommend actions to more effectively promote compact urban development and redevelopment to minimize urban sprawl and associated environmental impacts.

BACKGROUND:

Suburban growth in the Tampa Bay region and elsewhere has given rise to some inefficient patterns of development that can contribute to increased stormwater pollution and costly infrastructure needs by promoting low-density, single-use development at the expense of fostering compact urban development and redevelopment of previously impacted land.

Most new development today is suburban and characterized by low-density residential and commercial land uses. Single-use land patterns that separate residential development from retail and business sectors are most prevalent. Although commercial uses are usually grouped together in linear corridors flanking major roadways, there are rarely interconnections between sites, increasing the public's dependence on automobiles.

While new developments are subject to various stormwater and land-use regulations, the overall effect of this low-density single-use development is to commit an ever-increasing share of land resources within the watershed to suburban uses that increase impervious surface and ultimately result in more runoff pollution. Low-density development also results in greater distances between sites, resulting in longer and more frequent vehicle use and associated atmospheric pollution. Perhaps most importantly, it limits opportunities for efficient mass transit.

Costs to extend infrastructure (utilities, roads, stormwater systems) into outlying areas are extensive and ultimately borne by the community as a whole. As suburban areas expand, large tracts of urban areas are vacated, abandoned or maintained at less than optimal density, factors which discourage reinvestment and reduce the viability of these inner cores. Existing growth management and concurrency guidelines (primarily related to transportation) often penalize existing urban areas of development, while further promoting development in outlying areas.

STRATEGY:

This strategy is to convene a conference of experts from related fields and neighborhood interests to evaluate existing growth management strategies and recommend environmentally sensitive policies and actions to more effectively promote compact urban development and redevelopment. Recommendations would focus on encourag-

SW-6

ACTION PLAN

Water & Sediment Quality

ing reinvestment and redevelopment of the urban core and the development of mixed-use master-planned communities that cluster uses to conserve land and resources.

- STEP 1** Organize a Future of the Region conference to develop recommendations for promoting compact urban development and redevelopment by focusing on real-life scenarios with practical applications for Tampa Bay area communities. For example, conference participants could be divided into smaller working groups and assigned the theoretical task of "redesigning" an existing urban or suburban neighborhood to address common concerns about these mixed-use areas such as parking, setbacks between commercial and residential uses, traffic flow and open space. Demonstrating that urban or commercial areas can be compatible with residential areas in a well-designed plan will engender discussion about how these concepts can be incorporated into existing growth management strategies and may help to educate the public about these concepts.

Recommendations developed as a result of the conference can then be forwarded to local governments. Participants should propose specific recommendations on ways their suggestions can be implemented by local governments, and identify roadblocks that might prevent implementation.

Additional details about possible concepts that might be considered by the workgroups are found in the January 1996 draft of *Charting the Course*.

The conference should include local government planners and metropolitan planning and transportation organizations, as well as the American Planning Association (APA), American Institute of Architects (AIA) and American Society of Landscape Architects (ASLA), councils of neighborhood associations, and environmental/bay interests.

Responsible parties: Tampa Bay Regional Planning Council (TBRPC) to sponsor and organize conference, in partnership with metropolitan planning organizations (MPOs) and local governments.

- STEP 2** Implement recommendations from Step 1 through local government comprehensive plans, development codes and long-range transportation plans.

Responsible parties: local governments, TBRPC

SCHEDULE:

The conference can be planned in 1997, for implementation in early 1998.

COST:

Staff and administrative time is anticipated for implementation of these steps.

EXPECTED BENEFITS:

Redevelopment of existing areas and higher density and mixed-use development in suburban areas will conserve land and water resources, limit urban sprawl and reduce pollution.

MONITORING ENVIRONMENTAL RESPONSE:

Local governments conduct water quality monitoring and periodic planning studies that can gauge the net benefit from implementation of these policies.

REGULATORY NEEDS:

Possible amendments to Local Government Comprehensive Plans, land development and zoning codes, and MPO plans.

RELATED ACTIONS:

SW-4, SW-5

SW-6

Enforce and Require the Timely Completion of the Consent Orders for the Cleanup of Fertilizer Facilities in the East Bay Sector

ACTION:

Enforce and require the timely completion of conditions in the consent orders entered into by CF Industries, CSX Transportation, EAT Terminals, IMC-Agrico and Pakhoed Dry Bulk for the cleanup of wastewater entering the East Bay sector.

BACKGROUND:

In 1990, the Florida Department of Environmental Protection (FDEP) and the Environmental Protection Commission (EPC) of Hillsborough County discovered that five fertilizer shipping facilities in the East Bay area were discharging high levels of nutrients into the bay. A subsequent investigation determined that stormwater was mixing with fertilizer product from these facilities and that the wastewater discharges were not meeting current water quality standards.

Following lengthy negotiations, the five facilities entered into joint consent orders with FDEP and EPC in late 1991. The consent orders included requirements for regular sampling of storm-induced discharges, assessments of wastewater flows and concentrations at the facilities, and sediment sampling at the facilities and at adjacent loading docks. Upon completion of the assessment phase, each facility was to construct or implement the best management practices (BMPs) to manage its nutrient-enriched stormwater discharges.

While all five facilities have begun complying with the terms of their consent orders, progress has varied widely. Some facilities continue to fall short of required water quality standards, and deadlines for completion of site improvements remain undetermined.

IMC-Agrico has completed construction of a detention/treatment facility and is routinely monitoring its outfall, effectively completing the terms of its consent order.

CF Industries is also in its final phase, having completed its assessment, and has applied for a permit to construct a detention facility that would contain a 25-year/24-hour storm event.

Of the five facilities, CSX Transportation is believed to discharge the largest amount of nutrients to the bay. CSX has submitted a permit application and preliminary design plans to construct a retention and treatment system capable of containing a 25-year/24-hour storm event.

The adjacent EAT Terminal has installed pollution control equipment and is now testing its adequacy.

ACTION PLAN

Water & Sediment Quality

Pakhoed Dry Bulk, the smallest of the facilities, is implementing BMPs to reduce the amount of fertilizer product entering stormwater. These improvements include outside conveyer belts, truck load-out areas and roofing improvements at storage warehouses. Additionally, the company has submitted a permit application and design plans to retain the first inch of rainfall at the facility.

SW-7**STRATEGY:**

STEP 1 Enforce and require the timely completion of the consent orders.

- A. Continue to require implementation of BMPs and the construction of systems to detain and treat storm-induced discharges, and develop criteria to determine "compliance."
- B. Set deadlines for the final completion of the terms of the consent orders.
- C. Bring facilities into full compliance so they may enter a wastewater permitting and monitoring mode.

Responsible Parties: FDEP and EPC, in cooperation with the five facilities

SCHEDULE:

Step 1-A is ongoing. All facilities should be in full compliance within 12 months of completing construction of treatment systems.

COST:

Costs to implement BMPs at these sites vary according to design and magnitude, and are borne by the facilities under the consent order.

EXPECTED BENEFITS:

Reduced nutrient loadings to the already nutrient-enriched East Bay sector of Tampa Bay.

MONITORING ENVIRONMENTAL RESPONSE:

Individual facilities will monitor outfalls. Ambient bay water and sediment quality is monitored by EPC and other local governments.

REGULATORY NEEDS:

No further regulatory needs are anticipated.

RELATED ACTIONS:

N/A

SW-8

ACTION PLAN

Water & Sediment Quality

- STEP 3 Hold workshops and provide instructional materials in the correct use of fertigation systems. Contact local suppliers of fertigation systems and urge them to provide detailed guidance and support in use of the systems.
Responsible parties: local Cooperative Extension Service offices
- STEP 4 Explore possible cost-sharing programs, such as low-interest loans and grants, to provide financial assistance for the utilization of BMPs, especially for the dairy industry. For example, a fund might be established from nitrogen trading credits and administered through the Florida Farm Bureau. Ensure that the funding assistance available is sufficient to warrant participation by growers.
Responsible parties: NRCS, U.S. Department of Agriculture, Florida Department of Agriculture and Consumer Services, Agricultural Stabilization and Conservation Service, and local soil and water conservation districts

SCHEDULE:

Steps 1 and 2 can be accomplished in 1997. Steps 3 and 4 can be initiated in 1997, with a cost-sharing program identified or established in 1998.

COST:

Steps 1, 2 and 3 involve administrative costs. Costs for Step 4 have not yet been identified. Representative costs for a fertigation system are estimated at about \$700 (for mixing and nurse tank), plus installation at \$1,000 an acre. This estimate includes both the cost of the micro-irrigation system and fertigation components.

EXPECTED BENEFITS:

Use of fertigation systems is expected to reduce the amount of nitrogen entering the bay in agricultural runoff. Research being conducted by the Hillsborough County Engineering Services Department in cooperation with local growers may help quantify the benefits of fertigation vs. conventional fertilization practices. Farmers installing fertigation systems can monitor and report fertilization application rates, using fertigation systems to compare to baseline applications without these systems in place.

MONITORING ENVIRONMENTAL RESPONSE:

Ambient water quality in surface waters receiving runoff from agricultural lands is monitored by local governments and will be reported in a biennial Bay Environmental Monitoring Report.

REGULATORY NEEDS:

Revision to SWFWMD guidelines for AGSWMP to encourage fertigation systems where feasible and where micro-irrigation already is in use.

RELATED ACTIONS:

SW-9, TX-4

Improve Compliance with Agricultural Ground and Surface Water Management Plans

SW-9

ACTION:

Improve compliance with Agricultural Ground and Surface Water Management plans to reduce nutrient and pesticide runoff to the bay.

BACKGROUND:

Florida statutes exempt certain agricultural activities from surface water permitting requirements designed to minimize impacts to wetlands, flooding and water quality. However, confusion about or misinterpretation of the exemptions has led to agricultural activities which may have adverse environmental impacts.

In an effort to ensure that surface water degradation is minimized or eliminated, the Southwest Florida Water Management District (SWFWMD) and the Natural Resource Conservation Service (NRCS), formerly the Soil Conservation Service, have developed a voluntary program that assists farmers in protecting water resources. The Agricultural Ground and Surface Water Management Program, or AGSWMP, educates farmers about exemptions and helps farmers develop water management plans that often enable them to qualify for a permit exemption.

A matrix of best management practices (BMPs) has been developed for the program, listing each BMP and its potential benefits. Using this matrix, NRCS specialists inspect an agricultural operation and evaluate which BMPs are suitable. A plan is developed and the farmer is asked to implement its recommendations, providing a faster, non-regulatory avenue for compliance with surface water rules.

Since the program's creation in 1991, surface water management plans have been developed for more than 3,000 acres of farmland in Hillsborough and Manatee counties. While these efforts are impressive, the percentage of agricultural lands managed under these plans remains small in comparison to the farmed acreage in the region. Hillsborough and Manatee counties, for example, had more than 112,000 acres devoted to citrus, vegetables, or some other form of intensive agriculture in 1990.

Compliance also has been a lingering problem with the program. Once the plan is approved, few if any follow-up inspections are conducted to ensure that farm operators have implemented the plans. Lack of sufficient staff to handle these responsibilities has been identified as a major reason for the lack of follow-up.

The AGSWM program provides a streamlined, less cumbersome approach for growers to comply with the intent of SWFWMD's wetlands and water quality protection rules. But without a reasonable effort to check on the implementation of the AGSWM plans, the effectiveness of the program cannot be determined.

SW-9

ACTION PLAN

Water & Sediment Quality

STRATEGY:

The strategy for this action involves one regulatory action to monitor compliance with AGSWM plans and one voluntary action to encourage greater participation in the program.

- STEP 1** When SWFWMD visits a farm in conjunction with a water use renewal permit, it can use that occasion to check compliance with the farm's AGSWM plan. The site visit made at the time of water use permit renewal provides a convenient time to verify that an existing AGSWM plan is being implemented as agreed to by the grower.

If the inspection shows that a farming operation is not in compliance with the approved AGSWM plan, SWFWMD could allow a grace period in which to comply. Failure to comply within the grace period could be grounds to nullify the permit exemption and require a formal Environmental Resource Permit.

Responsible parties: SWFWMD, NRCS, with assistance in promoting compliance from the U.S. Environmental Protection Agency's (EPA) Pesticides Section

- STEP 2** Recruit growers in Hillsborough and Manatee counties who have successfully implemented AGSWM plans to showcase the results of their efforts to other growers who qualify for the AGSWM program.

Responsible parties: SWFWMD, NRCS, local extension services

SCHEDULE:

Both steps could be implemented in 1997.

COST:

Both steps could be accomplished with existing resources.

EXPECTED BENEFITS:

More widespread participation in and compliance with the AGSWM program will reduce agricultural runoff and wetland impacts, improving water quality in the bay.

MONITORING ENVIRONMENTAL RESPONSE:

Ambient surface water quality and sediment monitoring will be conducted as part of the biennial Bay Environmental Monitoring Report.

REGULATORY NEEDS:

Existing SWFWMD surface water management rules would allow the agency to link renewal of water use permits to compliance with AGSWM plans.

RELATED ACTIONS:

SW-8, TX-4